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ON A NEW FAMILY IN THE NOTOSTIGMATA.

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The highly interesting genus *Ophilioacarus* was first made known by the Danish zoologist D. J. With in 1902 in a preliminary paper published in the "Comptes rendus du congres des Naturalistes et Medecins du Nord" under the title, "A New Acarid. *Ophilioacarus segmentatus*." This form, which presents a very distinctive synthesis of arachnid characters, was regarded as having strongest affinities with the Acarina under which it was placed in the new suborder Notostigmata, a name referring to the distinctive feature presented by the four pairs of tracheal spiracles opening dorsally on the anterior abdominal segments which are well defined. Subsequently (1904) With presented a detailed account of both the external and internal morphology of *O. segmentatus*, the types of which were from Algeria but were found also in Corfu, as well as descriptions of two other species, *O. italicus* from Italy (Sicily) and *O. arabicus* from Arabia. In this paper With proposed to replace the "badly chosen name" *Opilioacarus* by *Eucarus*, and the family *Opilioacaridae* by *Eucaridae;* but under the rules of nomenclature the earlier names must stand.

Soon after the appearance of With's paper, F. Silvestri (1904) added a fourth species *O. platensis* from Argentina and Uruguay in South America. In 1936 F. Grandjean published an exhaustive study of the external morphology of *O. segmentatus* based upon abundant material of this species secured by himself in Algeria in 1935, confirming in the main the findings of With. Finally, in 1937, V. Redikorzer described a fifth species from Russian Central Asia ("Semiretobje, Schlucht des Flusses Tujuk, steiniger Absturz"), under the name *Ophilioacarus hexopthalmus*. The specific name refers to the presence in this species of three pairs of eyes in place of the two present in the other forms referred to *Opilioacarus*, a smaller eye being said to be present on each side between the two of ordinary size. In addition *hexopthalmus* seems to be set off by a difference in the segmentation

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of the legs, the first two pairs of which, according to Redikorzer's figures, have no intercalary segment (proximal division of femur) between trochanter and femur proper, although an extra joint, a second trochanter in the nomenclature used by With, is present on the last two pairs.

These differences in eyes and legs would seem to be of generic value. Accordingly, a new genus **Paracarus** is here proposed for reception of the species *hexopthalmus.*

In 1939 and 1940 the junior author secured numbers of the new type of Notostigmata herein designated as *Neocarus* from Texas and Arizona, the first members of the suborder to be recorded from North America. The specimens from Texas were taken in several localities but chiefly in Kerr and Hidalgo counties. Those from Hidalgo County were taken in a region from which during the years from 1932 to 1939 he had collected extensively material of all nine orders of terrestrial arachnids, including the peculiar Ricinulei. This area, about Edinburg, is typical Lower Sonoran mesquite-huisache association. The specimens of *Neocarus* from here were taken under a large piece of sheet iron beneath a dense, shady mesquite tree. This cover had apparently not been disturbed for several years. Under this same cover were found numerous other species of arthropods, among them insects, spiders, scorpions, isopods, phalangids, mites, pseudoscorpions and myriopods. *Neocarus* is believed to be quite common in this area, but its small size and obscure habits have not led to extensive collecting. For a number of years before, specimens were present, but they were mistaken in the field for young of some insect and so were ignored. These arachnids move very slowly, carrying the anterior pair of legs in the air, apparently as feelers whose resemblance to antennae led to the earlier mistaken identity. However, when a cursory examination was made under a microscope, their true nature was revealed.

The specimens from Kerr County were taken in Upper Sonoran cedar-oak association under large rocks along with specimens of *Lacinius* and *Libitiodes.*

In discussing the ecology of *Opilioacarus segmentatus* as noted by himself in Algeria Grandjean says: "Je n'ae trouvé d'*Opilioacarus* que sous les pierres de grande Taille on fortement enfoncées. Il foute toujours que la pierre adhère bien an sol et qu'il n'y ait sous elle que des fissures ou des passages très surbaiasés dans lesquels un animal un plus gros ne puisse trouver une demeure." In thus securing a certain exclusive dwelling place, *Ophilioacarus* contrasts with the habits of Neocarus as above noted. *Opilioacarus* would also seem to be a more agile animal, for Grandjean says of it: "Dans la marche normale, d'allure circonspecte, l'animal tate continuellement le sol ava ses longues pattes antérieures qui sont pour lieu des antennes. Si l'animal rencontre un obstacle qui l'inquiète il peut courir tres vite à reculons. Alors les pattes antérieures sont lévees et ne servent pas. Si l'acarien doit fuir en avant il court moins vite mais il est cependant trés agile. Les pattes antérieures servent dans ce cas comme les 6 autres ou du moins les aident."

All type specimens of the new forms are at present retained in the collection of the University of Utah.

Family NEOCARIDAE, new.

Neocarus is regarded as representing a distinct family primarily on the basis of differences in the number and position of the tracheae. Whereas in all the known species of Opilioacaridae there are four pairs of dorsally opening spiracles, a pair to each of the first four abdominal segments, in *Neocarus* the four corresponding pairs are more closely clustered, with the first on the first abdominal segment, and the other three on the second; in addition there is a small median trachea opening by a mid-dorsal spiracle situated in the furrow between the second and third thoracic segments.

Genus **NEOCARUS**, new.

With the characteristics noted for the family.In addition the complete lack of a proximal segment to femur II may be of generic significance.

Genotype—Neocarus texanus, new species.

Neocarus texanus, new species.

The size is comparable to the other members of the suborder. The length is about 1.7 mm., the greatest width 0.7 mm. is at the middle of the abdomen.

The head is divided into two parts. The head proper bears the two pairs of eyes and the pseudocapitulum which encompasses the pedipalps and the mouthparts proper. Between the head and the thorax there is a short straight transverse groove.

C. J. With considered this suborder as possessing two thoracic segments. On close examination *N. texanus* shows what appears to be three thoracic segments. The first segment is set off from the head by a short suture. The second segment is very short, being midorsally about one-seventh of the length of the first and set off from it by a short suture. The third segment is about two-fifths as long as the first and set off from the second by a longer straight suture which disappears on the sides, and from the abdomen by a backward curving suture which extends almost to the coxae.

The ten abdominal tergites are marked by more or less distinct bluish crossbands and separated by shallow but nevertheless distinguishable grooves which disappear on the sides.

On either side of the head are black eye-patches in which are two oval eyes. The anterior is slightly larger and separated from the posterior by about half of the diameter of the larger. The interspace between the two pairs is about two-thirds of the head width at a line across the eyes. The head length is about equal to the width. The widest part is a little behind the eyes.

Along the mid-dorsal line in the suture between the first and second thoracic segments is a small spiracle. Along each side of the abdomen are four closely placed spiracles. The first is placed on the first abdominal segment low on the side. The other three form an equilateral triangle and are placed on the second abdominal segment somewhat higher than the first. The most posterior spiracle of the triangular group appears to be in the suture between the second and third segment. The greatest distance across the four spiracles on a side is about one-thirteenth of the length of the animal. Dichotomous branchingly tracheae ramify from these spiracles.

The pedipalps are as figured. They lie along the labrum and articulate under the rostrum, and consist of five segments. At the tip are pairs of claws not unlike those on the legs.

The legs vary in length and consist of a coxa, one or two trochanters, femur, patella, tibia, metatarsus, and a tarsus. There are two claws on each. Leg I is slender and longest, being about half longer than the body. There is a single trochanter and a false segment at the base of the femur. Leg II is third in length, but shorter than the body. This also has a single trochanter on the dorsal side of which is a tooth-like process so constructed as to articulate with a rounded prominence on the lateral margin of the thorax. This apparently limits the dorsal movement of the trochanter. Leg III is shortest and provided with two trochanters. The basal one has on its dorsal surface a process similar to that on Leg II. Leg IV is second in length and about a seventh longer than the body. There are two trochanters. On the ventral surface of the legs are transverse grooves varying in number on the different legs. These may have a sensory function. On the dorsal and lateral surfaces of the legs excepting the tarsi are fan-shaped hairs which tend to an arrangement in about five rows. There are fewer such hairs on the ventral surface, and these are less definitely placed. There is a distinct terminal hair on the distal end of the dorsal part of the tarsus of leg IV. Beneath the tarsus is a plumiform setae of about four bristles.

In the area anterior to the sternum, between the coxae of the first legs and posterior to the base of the pseudocapitulum are two stylets which meet along their inner borders and project ventrally. These are about .18 mm. long. The tip of these stylets is equipped with a bristle about a fifth of the length of the stylet, and on the posterior lateral side of each is another bristle placed two-thirds of the distance from the base. This is longer than the terminal bristle and about half the length of the stylet.

On the body beneath there are scattered a number of variously shaped lyriform fissures. There is no definite arrangement of these.

Texas: Hidalgo County, Edinburg, male holotype, May 21, 1939; female allotype, one paratype, January 1, 1935. Kerr County, 16 miles south of Kerrville, two paratypes, December, 1939, one paratype August, 1940, two paratypes September, 1940. Hays County, one paratype, April 15, 1939. Starr County, 5 miles east of Rio Grande City, January 21, 1939.

Neocarus arizonicus, new species.

This species is similar in many respects to *N. texanus*, new species. The ground color is a pale buff. The pigmented areas on the head are differently arranged and less pronounced. There is only a faint indication of pale brown cross-bands on the segments of the abdomen.

The eyes are in two pairs arranged much as in *texanus*. There is a minute clear spot in the dark eye patch above the two eyes. It is possible that the so-called third eye described by Redikorzer for his *O. hexopthalmus* is a similar spot.

The legs are pale yellow with light blue rings which extend over more than three-fourths of the length of the segments. The plumiform bristle under tarsus IV has only two branches.

The lateral prominences which articulate with the tooth-like structures on trochanters II and III are more pronounced than in *texanus*.

Since this species is represented by only one specimen from which some of the appendages are missing, detailed study was not possible. The authors feel that with more material the differences between the two new species discussed in this paper will be more readily determined.

Arizona: Duncan, one specimen, September 9, 1939.

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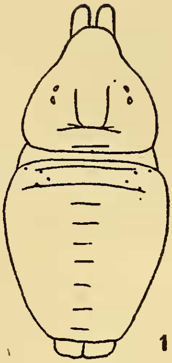
EXPLANATION OF FIGURES OF *Neocarus texanus*, sp. n.

PLATE I.

Fig. 1. Dorsal view of body, showing segmentation and position of spiracles.
Fig. 2. Detail of median spiracle.
Fig. 3. Fan hair from side below eyes.
Fig. 4. Ventral view of anterior portion of body.
Fig. 5. Maxilla.
Fig. 6. Left chelicera, lateral view.
Fig. 7. Claw of chelicera.
Fig. 8. Pedipalp, mesal view, with fan hair of same shown below.
Fig. 9. Tip of pedipalp.

PLATE II.

Fig. 10. Presternal stylets.
Fig. 11. View of left side of carapace, showing bases of legs, etc.
Fig. 12. Schematic view of region through base of second leg and side of body.
Fig. 13. Ventral view of genital area of what is regarded as the male.
Fig. 14. Genital appendage (ovipositor) of female, lateral view.
Fig. 15. Leg II and details of same.
Fig. 16. Trochanter of leg II, anterior view.
Fig. 17. Leg III, with detail of fissure on sixth joint of same.
Fig. 18. Leg IV, with fan hair from same.
Fig. 19. Apical portion of leg IV.
Fig. 20. Tip of pedipalp.



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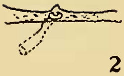

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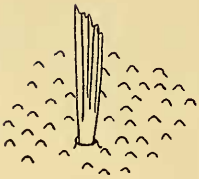

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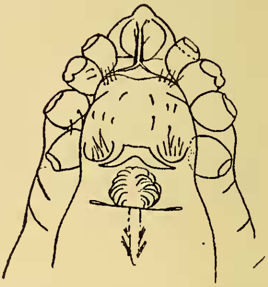

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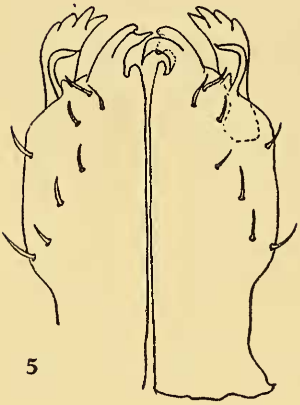

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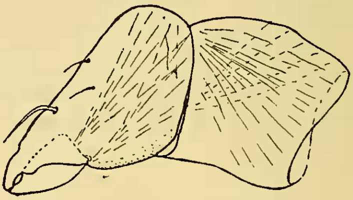

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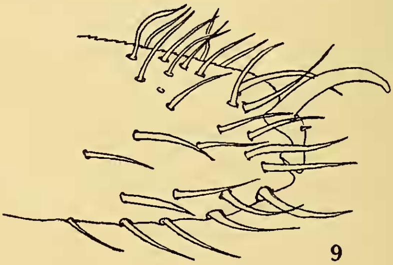

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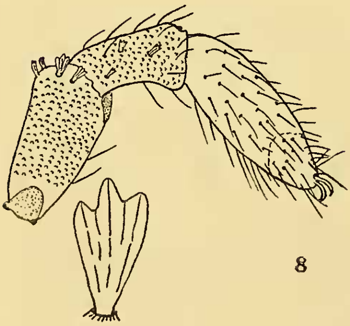

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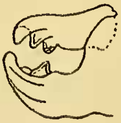

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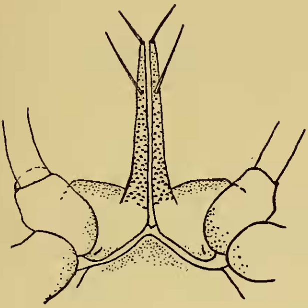
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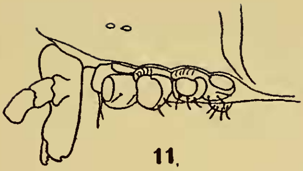
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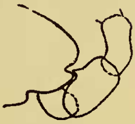
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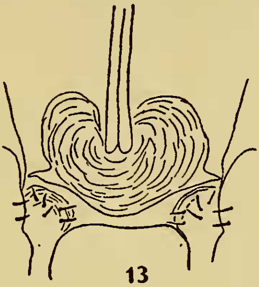
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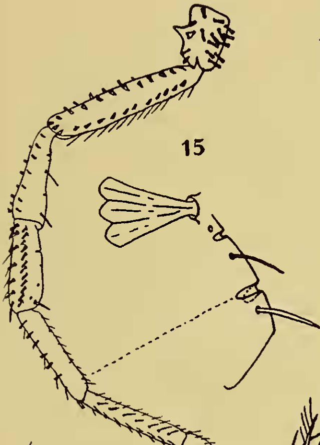
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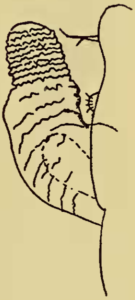
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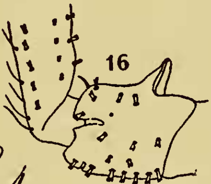
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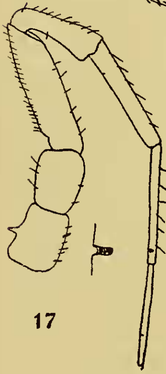
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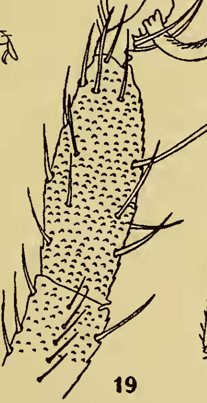
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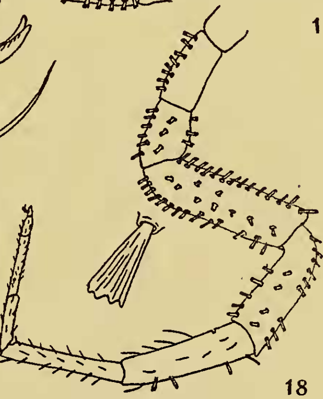
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